

WHAT IS CLAIMED IS:

1. A method for neutralizing a mine or unexploded ordnance comprising explosive in a casing, said method comprising:

(a) reacting a reactive compound that undergoes a self propagating high temperature synthesis (SHS) reaction to form high temperature reaction products in quantity and at a rate sufficient to disrupt and perforate the casing, wherein the reaction products are mostly liquid;

(b) causing the high temperature reaction products to disrupt and perforate the casing at a plurality of locations sufficient to create a reaction front that converges on the casing and thereafter ignites the explosive;

(c) limiting the spread of the liquid high temperature reaction products;

(d) supplying an oxygen-rich gas stream to the casing or explosive to enhance disruption of the casing or burning or decomposition of the explosive; and

(e) burning or decomposing the explosive for a time sufficient to destroy the explosive;

wherein the reactive compound is selected from the group consisting of (i) an essentially stoichiometric combination of sulfur and a metal selected from the group consisting of zirconium, chromium, indium, titanium, manganese, iron, and blends thereof and (ii) an essentially stoichiometric combination of carbon and a metal selected from the group consisting of hafnium, zirconium, titanium, silicon, and blends thereof; and

wherein the reactive compound consists essentially of particles having particle size less than about 100 microns.

2. The method of claim 1 wherein the mine or unexploded ordnance is at least partially immersed in water.

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3. The method of claim 1 wherein the mine or unexploded ordnance is at least partially overburdened by ground or debris, and further comprising removing at least part of the overburden therefrom by a release of gas.

4. The method of claim 1, wherein the reactive compound consists essentially of particles having particle size less than about 1 micron.

5. The method of claim 1, wherein the mine or unexploded ordnance further comprises propellant, and the propellant also is burned or decomposed.

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6. A method for neutralizing a mine or unexploded ordnance having a casing comprising explosive material, said method comprising:

(a) reacting a compound that undergoes a self propagating high temperature synthesis (SHS) reaction to form high temperature reaction products in quantity and at a rate sufficient to decompose the content of the casing, wherein the reaction products are mostly liquid;

(b) limiting the spread of the liquid high temperature reaction products;

(c) supplying an oxygen-rich gas stream to the casing or explosive to enhance decomposition of the casing or burning or decomposition of the explosive; and

(d) decomposing the content of the casing by heating the casing with the high temperature reaction products for a time and at a rate sufficient to increase the pressure in the casing to cause the casing to fracture and, before the explosive detonates, to (i) scatter the explosive or (ii) burn or decompose the explosive for a time sufficient to destroy the explosive;

wherein the reactive compound is selected from the group consisting of (i) an essentially stoichiometric combination of sulfur and a metal selected from the group consisting of zirconium, chromium, indium,

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titanium, manganese, iron, and blends thereof and (ii) an essentially stoichiometric combination of carbon and a metal selected from the group consisting of hafnium, zirconium, titanium, silicon, and blends thereof; and wherein the reactive compound consists essentially of particles having particle size less than about 100 microns.

7. The method of claim 6 wherein the reactive compound consists essentially of particles having particle size less than about 1 micron.